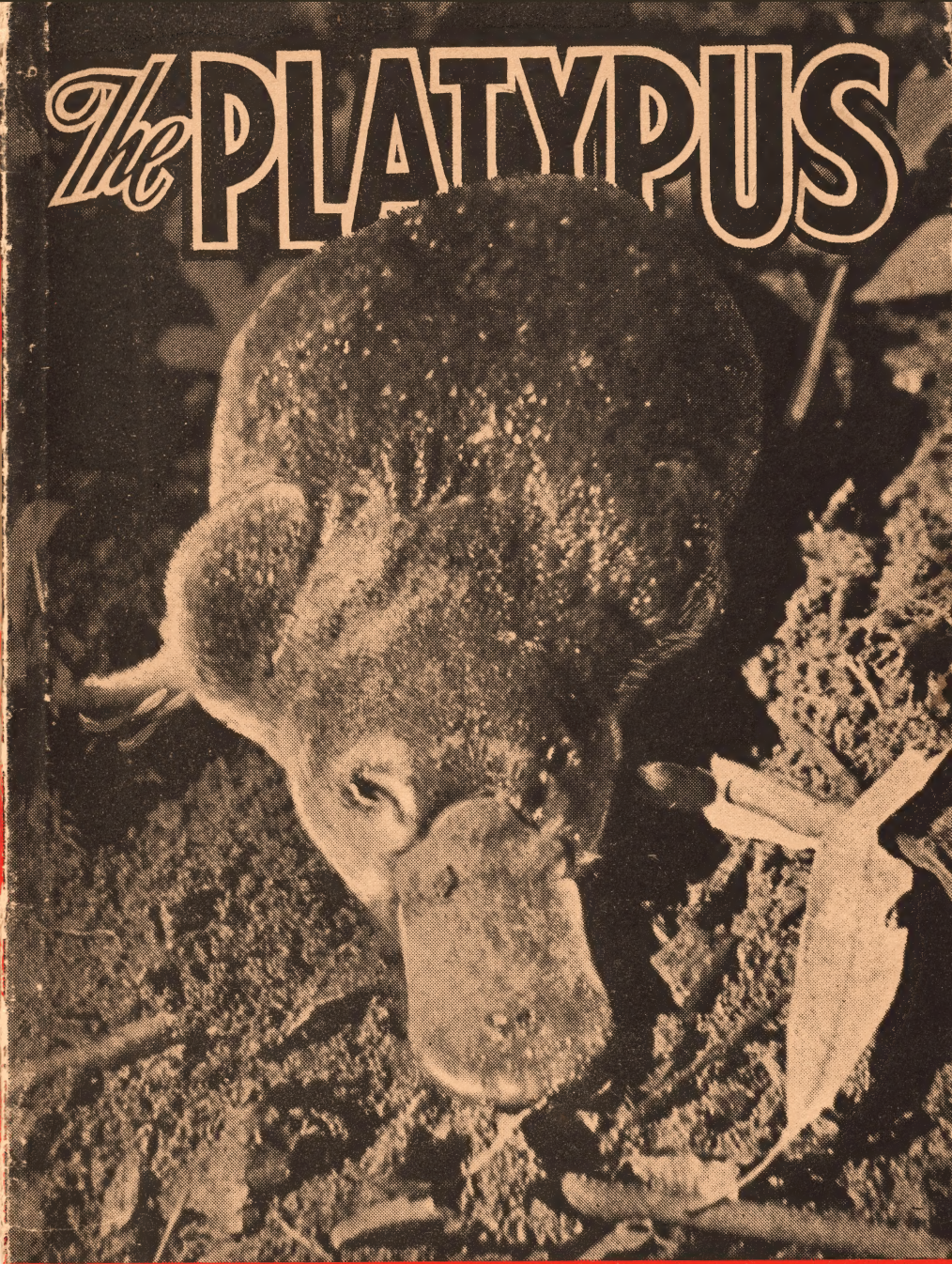
The PLATYPUS



By CHARLES BARRETT, F.R.Z.S.

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The World's Wonder Animal

"Splash," photographed on his fourth birthday in captivity
Herald Feature Service

The World's Wonder Animal

THE PLATYPUS

By

CHARLES BARRETT, F.R.Z.S.

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To

ROBERT EADIE, M.B.E.

The Platypus Man

who added so much to our knowledge
of the World's most wonderful Mammal

ACKNOWLEDGMENTS

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Photo. Morwell Hodges

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EARLY HISTORY

Nature laughs at scientists of the type represented by the Frenchman, Etienne Geoffroy, who "proved beyond all possible doubt" that the Platypus was not a mammal, because it laid eggs; neither was it a bird, nor a reptile: the amazing little creature from the Antipodes must have a class to itself. Geoffroy was by no means the only savant to be deceived and led to wholly wrong conclusions. The Platypus was the greatest zoological puzzle that the learned men of Europe had ever tried to solve. Solve it they did at last—almost a century after the first specimen of Ornithorhynchus reached England, creating in scientific circles such a hubub as had rarely, if ever, been known before.

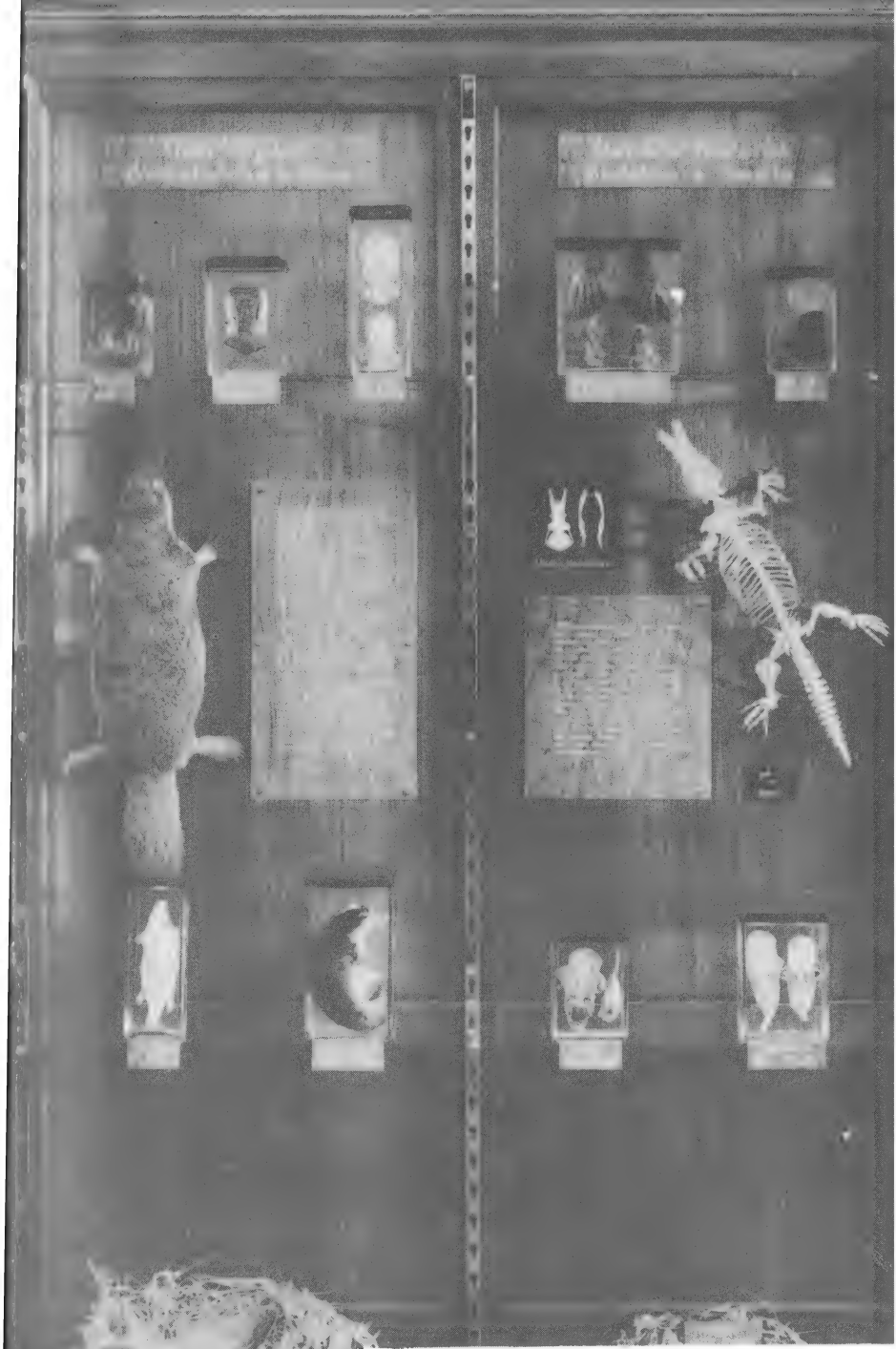
Certain forgotten savants of great importance in their day dismissed the Platypus as an obvious fake, comparing it with the mermaids manufactured by artful Chinese, and consisting each of a fish's tail attached to the mummified body of a monkey. Those "monstrous impostures," as a contemporary anatomist called them, were sold at fancy prices to sailormen, returning from voyages in the "Indian Seas." A furred creature with a duck's bill and webbed feet might easily be another Chinese imposture. So the Platypus remained for some time under grave suspicion. Those who accepted it as genuine spoke profoundly of Nature's infinite variety, and one of them named the strange animal from Port Jackson *paradoxus*.

The Duck-billed Platypus was discovered in 1797, on the banks of a lake near the Hawkesbury River, New South Wales, as recorded by Lieut.-Colonel David Collins, sometime Judge Advocate and Secretary of the Colony, in his *Account of the English Colony in New South Wales*. This is the earliest written description of the "duck-bill" or "water-mole," as it was called by the first white people to observe it, nearly one hundred and fifty years ago:

"In size it was considerably larger than the land mole. The forelegs, which were shorter than the hind, were observed, at the feet, to be provided with four claws, and a membrane, or web, that spread considerably beyond them; while the feet of the hind legs were furnished, not only with this membrane, or web, but with four long sharp claws, that projected as much beyond the web, as the web projected beyond the claws of the forefeet. The tail of this animal was thick, short and very fat; but the most extraordinary circumstance observed in its structure was its having, instead of the mouth of an animal, the upper and lower mandibles of a duck. By these it was enabled to supply itself with food, like that bird, in muddy places, or on the banks of the lakes, in which its webbed feet enabled it to swim; while on shore, its long sharp claws were employed in burrowing; Nature thus providing for it in its double or amphibian character. These little animals had been frequently noticed rising to the surface of the water, and blowing like the turtle."

Governor Hunter made a drawing of the "amphibious animal of the mole kind," and his Judge Advocate included an engraving from this first portrait in his book. It does not flatter a really attractive animal, making its body look like that of a miniature porpoise, and dwarfing the large, wide bill. The water colour drawing made by J. W. Lewin in 1810, and now preserved in the Mitchell Library, Sydney, is very much nearer to Nature, and, indeed, a passable portrait of the "water-mole."

The first specimens of the paradoxical creature to reach England were only dried skins; subsequently, Platypuses preserved in spirit were sent to Sir Joseph Banks; one by Governor King, who entrusted the cask with the precious contents to a military officer returning to the Homeland. King's predecessor, Hunter, already had sent two spirit specimens to Banks. Everard Home, a distinguished anatomist, dissected these specimens, and gave the first scientific description of the Platypus, based upon the study of both its external and internal structure. Two Germans had anticipated him; but one of these had only a mounted specimen to work upon, while the other plagiarised the description given in Shaw's *General Zoology*. Dr. George Shaw was a lucky man: in 1798 he received from a naturalist named Dobson, a skin of the wonder animal from New South Wales, and thus was able to describe and name it, in his *Naturalist's Miscellany*, a rare work in many volumes, with curious illustrations. The volume containing a figure and description of *Platypus anatinus*, was



Portion of the Harry Burrell Platypus Collection.
—(Photo. Australian Institute of Anatomy)

published in 1799, a year before the German anatomist Blumenbach described the animal under the name *Ornithorhynchus paradoxus*. Though *Platypus* came first, it had to give place to *Ornithorhynchus* when some inquiring spirit discovered that the former name had already been appropriated to a genus of beetles. Thus the most wonderful of all living mammals bears a scientific title given to it by a German professor. Happily, "Platypus" survives as a popular name. "Water-mole" is completely out of fashion, though "duck-bill" is still used occasionally.

Everard Home's learned paper, read before the Royal Society of London, and published in *Philosophical Transactions*, in 1802, put the Platypus on the scientific map; no longer could it be regarded by the unprejudiced as a possible Chinese imposture. But controversy continued, as regards the nature of the paradoxical animal. Was it a true mammal, or did it form a class of its own? There was much argument on both sides of the Channel. At length, all reasonable persons concerned in the great discussion agreed that the Platypus *was* a mammal, and accordingly it was placed in a sub-class of the great zoological group to which we humans belong—Mammalia: animals which suckle their young. Geoffroy had previously grouped Platypus and Echidnas in a new Order to which he gave the name Monotremata; but he stubbornly defended his isolationist view that they were not true mammals, even after the discovery, in 1824, of mammary glands in the Platypus.

There were some false alarms before authentic eggs of the Platypus were obtained. It had long been a generally accepted belief in New South Wales that the Platypus did lay eggs and suckle its young. The aborigines had told settlers about nesting burrows, and eggs which the *mallangong*, as they called the Platypus, laid and hatched, sitting upon them like a mother bird.

The laying of two eggs by a captive Platypus was reported in 1864, from Wood's Point, Victoria. But it was not until twenty years later that the question was solved—beyond all scientific doubt. Eggs of both Platypus and Echidna were obtained in Queensland by a Cambridge zoologist, W. H. Caldwell, who came out to Australia purposely to investigate the reproduction of monotremes and marsupials. The whole history of the controversy on the laying of eggs by *Ornithorhynchus anatinus* is given in Harry Burrell's notable work, *The Platypus*, from which the facts given above are taken.

All that we know concerning the ancestors of our egg-laying mammals was summarised by C. W. De Vis, in a paper on an extinct form which he named *Ornithorhynchus agilis,* read before the Royal Society of Queensland, and published in that body's *Proceedings* for the year 1884. Remarking that an arm bone of a large extinct Echidna had been described by Krefft in 1868, and a similar bone was in Sir Richard Owen's possession in 1883, De Vis continues: "To all who gave attention to the subject, the discovery of some trace of a fluviatile monotreme comparable with the existing Platypus must have seemed a mere matter of time and good hap; and by time and good hap the expectation has been fulfilled, and a relic has been found of an ancestor of the living Ornithorhynchus." This precious bone, a right tibia of an adult animal, was dug up at King's Creek, in the vicinity of Pilton, Queensland. It indicates, not a giant form, but one even smaller than the existing Platypus; nor does it bear any sign of having been inherited from a more reptile-like precursor. Subsequently, a mandible of the fossil Platypus was collected at King's Creek. These relics date back to newer Tertiary times—some five million years ago, if we accept a geologist's estimate.

PORTRAIT OF THE PLATYPUS

So singular is the make-up of the Platypus, so widely do its habits differ from those of all other living mammals, little or no comparison with any species can be made. Ornithorhynchus *is sui generis.* No wonder that, faced with such a creature to be classified, even skilled anatomists were bewildered.

It is easy for us to smile at excitable Frenchmen, sedate English savants, and all-wise German professors: to smile at them from a cairn of knowledge which they commenced to build with small pebbles. A cairn still uncompleted, but high and firm now, because of the work of such patient, masterly observers as Robert Eadie and Harry Burrell, both of whom have devoted years to the Platypus, and expended considerable sums of money in carrying out their researches on the life history and habits of the most paradoxical creature in the world: an animal which, to use Robert Eadie's own words, has a bill like a duck's, fur on its body, coarse hair on its tail, web feet, claws for burrowing, spurs connected to poison glands; which lives in the ground, feeds in the water, lays eggs and suckles its young. Such is the Platypus. Details of the portrait must be filled in, for every detail is interesting and important.

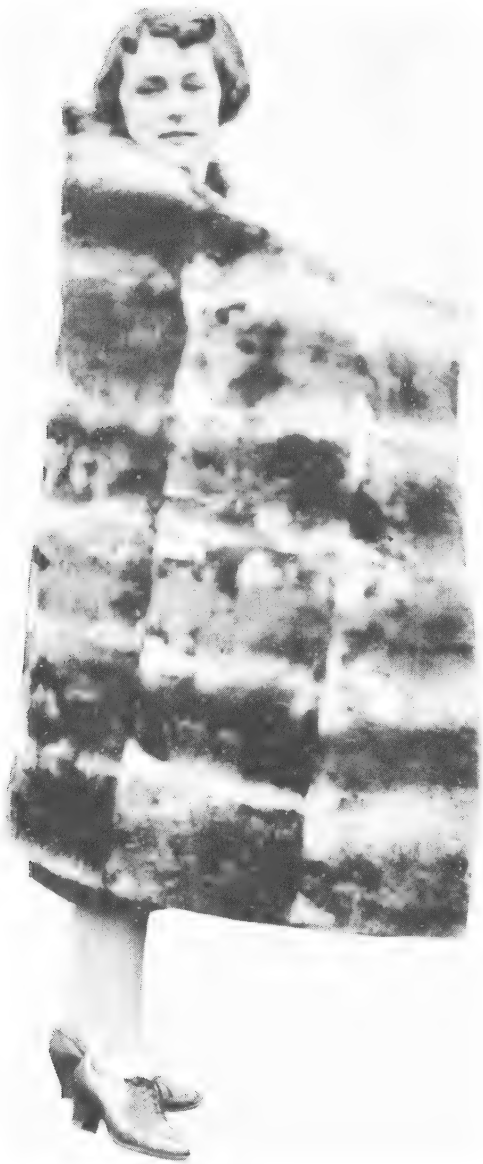
Fully-grown, a Platypus measures about 22 inches in length —from tip of bill to end of tail, and weighs, on an average, four and a quarter pounds. Of fifteen specimens collected by Dr. George Bennett, the length of the males averaged from 19 inches to 20 inches; that of the females, from 18 inches to 19 inches. One male, the largest obtained, measured just under 2 feet. Maturity is reached at the age of about two years and six months. Thick, loose skin makes the animal appear larger than it actually is, the body being surprisingly small. Upper and lower portions are covered in soft fur; that on the back and sides usually is of a reddish-brown hue, shading into yellowish-silver below: with sunlight gleaming

upon it, this fur pelt of the under surface has a most beautiful appearance. Before game laws came to the rescue, the Platypus suffered much persecution from pelt hunters. Platypus rugs were not uncommon, and thousands of skins went to their making. Now it is unlawful, at least in Australia, to possess either a skin, or a mounted specimen of our world-famous animal. When a Platypus rug was exhibited in London, some years ago, the news was cabled to Australia, and many newspapers published it with comments; those best informed expressing surprise that a rug made of the pelts of a strictly protected animal should be publicly displayed. The report stated that the rug, made up of forty-two perfect skins, was owned by a young woman aristocrat who, now impoverished, was offering it for sale. She had found among some family papers a ticket for goods in storage, deposited before the war of 1914-18. These "goods" proved to be a Platypus-skin rug, whose value no expert in London could assess. The pelts had been given half a century ago to a British peer holding a highly important post in Australia.

The fur colour varies. Especially in the male Platypus are darker shades noticeable at times; specimens almost black have been observed. Rarely are two specimens of exactly the same colour found. The fur of the older animal has a darker tinge than that of the younger one. The female, which is invariably smaller than the male, may readily be identified by the more pronounced reddish hue of her fur. It is difficult to differentiate between the sexes in very young examples, but the difference becomes more apparent as they grow older and increase in size.

Although the Platypus has a duck-like bill, the resemblance is merely external. The front of the upper mandible is soft, like kid, while the covering of the horny structure, which is carried up as a shield-like flap, and close to the eyes, is very soft and of rubbery texture. On the lower side of the bill this covering extends for some distance along the throat. These very flexible extensions are not attached to the forehead and the throat, and one can easily turn them back on to the upper or lower portions of the bill; released, they spring back to their proper positions.

"It is not very clear," Robert Eadie writes, "what purpose these flaps serve, but it may be that the extensions are an assistance in digging into clay or mud. They may permit of a greater depth being attained for each scoop or 'bite' before the mud comes in contact with the fur. All this, of course, is mere conjecture."



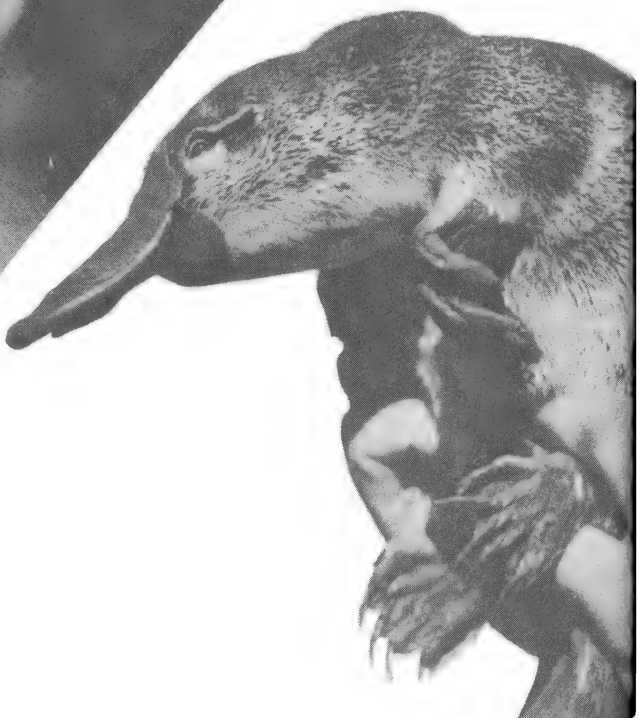
Priceless Furs. The famous rug formed of 42 Platypus skins.

(Photo—Planet News Ltd., London)

The Platypus lacks teeth, their place being taken by horny ridges arranged along the edges of the bill in a diagonal direction, something like the cuttings on a millstone. These horny serrations enable the animal to grind food into pulp before it is swallowed. But the crushing pressure is so slight that a fairly large worm, for instance, is "pulped" only with great difficulty; while the Platypus needs the aid of its forefeet in breaking up a big worm. Though toothless when full grown, the Platypus in an immature stage possesses true teeth in the back portion of the jaws. They function for a little while, then, being worn down, are shed, while the surface of the gums beneath and around the stumps gradually hardens until on each mandible is formed a crushing plate. Its food being obtained under water, the Platypus has cheek-pouches in which to store the large quantity gathered in a brief space of time. "The strange continuation of the jaws in the curiously flattened beak," writes Professor Frederic Wood Jones, "naturally leads to the formation of a very peculiar mouth cavity." Cheek-pouches are developed. "The flatened fore part of the mouth, therefore, leads into two spacious pockets, into which the food is shovelled as the animal muzzles about in the mud at the bottom of the creek." (*Mammals of South Australia*, Part 1, p. 50.)

The small, beady eyes are brilliant and of a light-brown colour. The ear, situated just behind the eye, really is only a fold in the skin, and when closed gives no external indication of its presence. The animal's webbed feet are furnished with claws, but only the front pair is used in burrowing, the webbing being tucked under the palm so as to give the strong claws free scope for working. The hind feet have a splayed tendency, and possess strong gripping powers. Their sharp claws are hooked in a lateral direction, so that, when an object in which its claws can function is seized, the grip is so firm that the animal may easily be lifted to a considerable height above the water without losing its hold. The spurs on the hind feet are dealt with in a later chapter.

When the animal is cleaning or grooming its fur, the claws of the hind feet are bunched so as to form a comb. And, by means of a ball and socket-like hip joint, each hind foot can be turned to reach any portion of the body; thus the Platypus performs toilet operations in the middle of its back as readily as it grooms the under surface of the body. "The rapidity with which the foot is moved when engaged in the cleansing process is remarkable," writes Robert Eadie. "It can go over the whole of the body very quickly. The



Top Left: Note the small opening between the upper and the lower portions of the bill, for straining food. Top right: The Platypus has silvery fur on the under surface of its body. Below: Shows the webbing in front of claws on forefeet. Note the length of claws.

(Photos. Morwell Hodges)

Platypus is a particularly clean animal, and spends much time in frequent periods grooming. After feeding and before retiring to the sleeping chamber, the Platypus combs most of the water from its fur, thus enabling it to retire in a comparatively dry state."

The hair on the upper surface of the flat, broad tail is longer and much coarser than that of the body, and lacks the beautiful glossy appearance of the latter. The underside of the tail is almost naked in adult specimens, but covered by fine silvery white hairs in the young Platypus. The early colonists noticed this, and formed the opinion that the "water-mole's" tail became hairless underneath because of constant use as a trowel, beaver fashion, in making the nest!

Handsome, despite its duck-bill, when its fur is dry, a Platypus just emerged from the water presents an unattractive appearance, though hardly, to quote one observer's description, as sordid looking as a drowned rat. Nor does the little animal resemble, when swimming at the surface, a "lump of dirty weeds," floating down stream. Both these comparisons are exaggerated; still, one must admit that, to see the Platypus at its best, you must see it when, after grooming, all the fur is dry.

Despite its aquatic habits, the Platypus moves with surprising rapidity on dry land. The author once followed one for nearly a hundred yards, and had almost to run to keep up with it. Burrell timed a Platypus travelling over level ground and found that its top-speed rate was two hundred feet a minute. The animal walks, as it were, on its knuckles, the fore claws being bent under the foot and the fleshy membrane doubled back.

HAUNTS AND GENERAL HABITS

The Platypus ranges from Cape York to Victoria and Tasmania. It may be claimed as a native of South Australia on the strength of its occurrence in the Murray and the Glenelg, where those rivers flow just within the eastern border of the State. Never a very rare animal, it has become more numerous since being afforded protection, in many rivers and creeks of Eastern Australia. Besides running waters, the Platypus inhabits lakes and billabongs; thus it is found in Tasmanian lakes famed among trout fishers, who may often have a glimpse of the "water-mole" when it comes to the surface after feeding in the mud. Even the ice-cold water of alpine lakes and streams is congenial to an aquatic creature clad in dense fur. The author has seen a Platypus in a small lake on Mount Kosciusko, at an altitude of nearly 6,000 feet; and was told that a pair of the animals had lived there for years.

Tropic streams seem to suit the Platypus just as well as those of southern Victoria, and Tasmania. But it must have mud; since its food is obtained chiefly from the lake- or river-bed, where are stored vast quantities of freshwater shrimps, larvae of aquatic insects and other items on the menu. The mud which lies deep on the bed of its home-stream is the duckbill's food reservoir. Having a huge appetite, the animal spends much of its time extracting food from the mud with its shoveller-like bill. Though delighting in clear water when not feeding, it will sieve the ooze where a drain empties into the river, bringing drowned insects and other edible tit-bits. Heavy rains replenish the mud-reservoir, sweeping into waterways from wide areas of country millions of tiny creatures.

Not content with mud-sieving alone, the Platypus eats living water-insects, also tadpoles and worms. Its liking for tadpoles possibly, as Robert Eadie suggests, explains why it is sometimes seen on a walkabout. Leaving the river, it goes in search of tadpoles in neighbouring shallow pools. When a Platypus is found at any

Bridge over Badger Creek, which flows through the Sir Colin Mackenzie Sanctuary. Figures, from left to right: The late Cherry Kearton, the late Mrs. Robert Eadie, Mrs. Kearton, Robert Eadie.

great distance from the home-stream, doubtless it has lost its sense of direction and become bushed, as it were. The vision of a Platypus along a horizontal plane is so hopelessly defective that very little would be observed on the surface of the ground.

When a Platypus appeared about fifty yards away from the banks of Badger Creek, Healesville, it caused commotion among a number of kookaburras, who apparently had not seen such a queer-looking creature before. They were quite agitated, and probably would have killed the little wanderer had they not been observed by a nature lover, and driven off.

Melbourne Zoo Platypus, close up and facing the camera.
(Photo. Herald Feature Service)

In the Healesville district of Victoria, where The Platypus Man carried out his observations, the animal is fairly numerous in streams which have their origin in the Great Dividing Range, and flow into and combine to form Melbourne's river, the Yarra Yarra. "It

would appear that, where rivers are made up of a series of deep pools, there the water is sufficiently tranquil to permit the settlement of food supplies in their muddy beds. These conditions obtain to a greater extent in the Watts than in any of the other streams, consequently, the Platypuses are most frequently observed there. The other rivers are comparatively free from pools, are fast-running, and the beds are usually very stony. Anything which will increase the rapidity of the flow of the rivers and diminish the number of pools will assuredly curtail the food supply of the Platypus, and this will eventually become a prime factor in its extinction."

Haunts of the Platypus usually are picturesque, often beautiful, with the charm of running water and shade-giving trees. Places where nature lovers go, and maybe an angler or two, hopeful of catching a lusty trout, or a blackfish which has grown fat and lazy, but perhaps will be tempted by the right bait to venture out from its retreat beneath a sunken log. There are many such spots in Gippsland still. The author knows one of them, and often has stood upon a little green promontory, watching for a Platypus to rise, or come swimming around the bend, past a clump of silver wattles not far from the entrance to a nesting burrow. Once he waited with a cine-camera, and a Platypus rose three yards away, only to submerge in a flash when it heard a slight whirring sound. Or was it frightened by movement when the naturalist for a second forgot to be a statue?

Harry Burrell, in his chapter on sensory perceptions, states that, so far as he could observe, both the senses of hearing and seeing are rendered inoperative while the Platypus remains submerged; this being due principally to a "water-tight facial furrow, which simultaneously envelops the orifice of both ears and eye directly the animal decides to sound."

Robert Eadie credits the Platypus with a very keen sense of hearing. "The slightest sound—even at a considerable distance—is sufficient to account for an amazingly rapid disappearance. He can pick up sounds which are extremely faint, and becomes immediately alert, and often submerges rapidly." On the other hand, when the ear is strained to receive sounds, the eye appears to be unaffected, having a half-closed, sleepy look.

Doubtless, its ears give the Platypus warning of danger far more often than the eyes perform that service; yet those brilliant little light-brown beads are sharp eyes, judging by some of the author's observations. When he was standing on the bridge across

the Snowy River at Orbost late one afternoon, two duckbills appeared, lazily swimming. They dived when a too-eager naturalist climbed on to the railing for a better view.

In a deep pool of a Tasmanian stream a pair of Platypuses lived when the author was there searching for mountain shrimps (*Anaspides*), found higher up among rocks over which crystal-clear water flowed. Two wonders in one small mountain stream: the world's most wonderful mammal, and a little crustacean which is a "living fossil," differing but slightly from its ancestors which flourished millions of years ago. There is some analogy between Platypus and mountain shrimp, for both differ totally in their methods of reproduction from all other members of their respective classes. Whereas among the higher Crustacea generally, the female carries her eggs about in a brood pouch, or glued to swimming appendages beneath the tail, Geoffrey Smith tells us the mountain shrimp deposits her large purplish eggs among water-weeds or under stones. The adult Anaspides measures about two inches in length, and is very elusive, but young shrimps may occasionally be eaten by the ever-hungry Platypus on an excursion from the home pool.

In swimming, only the front feet of the Platypus are used, with a paddle-like action, the hind ones merely "idling" and keeping balance. The webbing of the forefoot is stretched out, giving the foot a fan-like appearance. A moderate speed is attained—about 40 feet a minute, according to his owner's observation of "Splash," who, by the way, could be rolled over very easily: his efforts to regain equilibrium were amusing to watch.

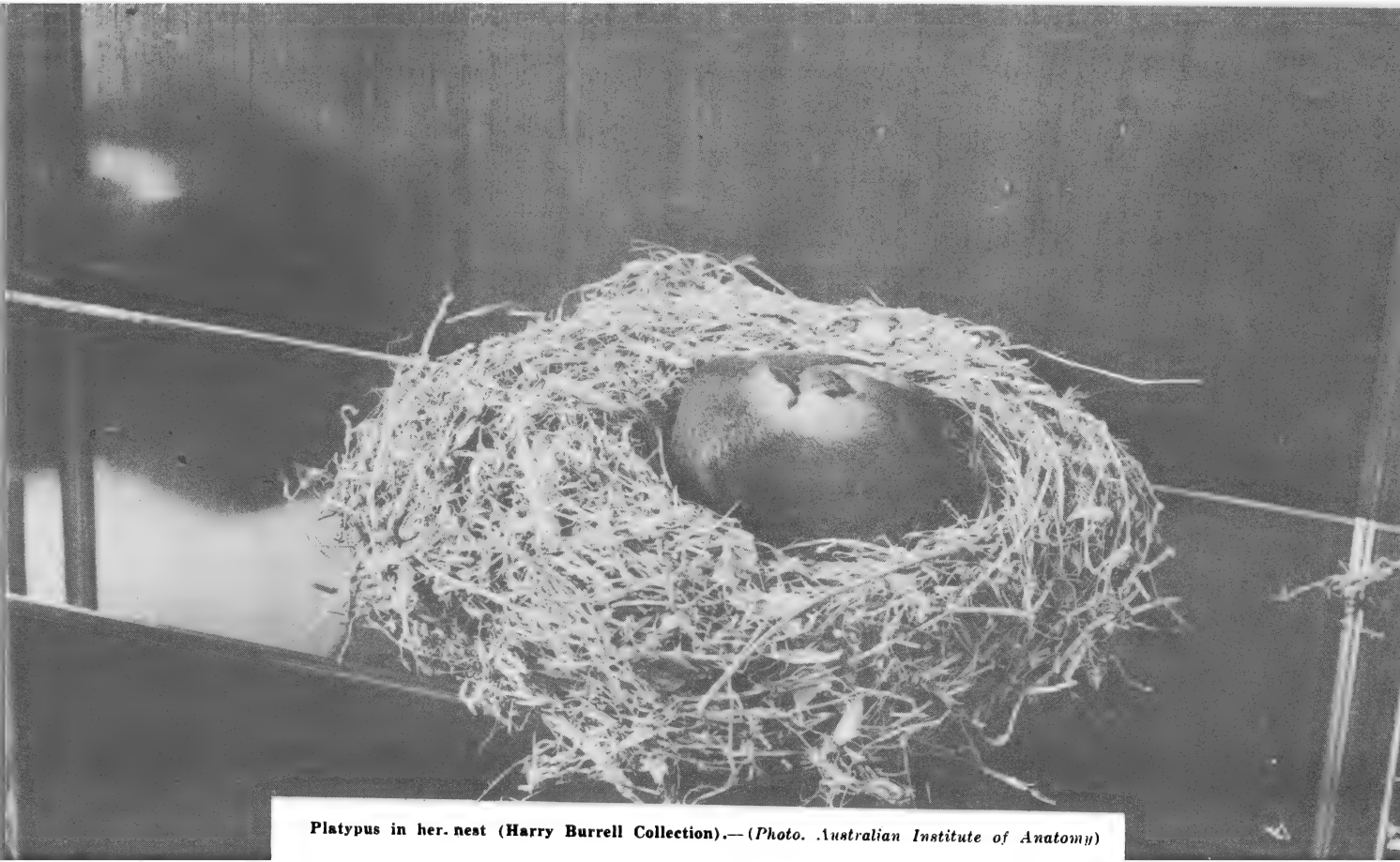
Forefeet and bill are used in burrowing. The webbing, which extends for more than one inch in front of the claws, is tucked under and into the palm. The hind feet act as a brace in keeping the animal up to the work in progress. Much of the shovelling and excavating is done by the soft bill, surprising as this may seem. It is just possible, Robert Eadie considers, that the bill does most of the work in loosening the soil, while the claws act as rakes.

Long before the era of Burrell and Eadie, those two masters of Platypus lore, our wonder animal was kept under close observation in captivity by Dr. George Bennett, who gives a fascinating account of two young Platypuses. When the Doctor located a nesting burrow, and decided to excavate it, his aboriginal friend, Daraga, gave sage advice. It was useless, he said, to dig up burrows of

"water-moles" then, for piccaninny, for "none yet tumble down" from mother. Later on, however, in rather "more than one moon, plenty piccaninny tumble down from old woman." It puzzled the blackfellow to know why, with an abundance of cattle and sheep available, the whitefellow should be so anxious to secure *mallangongs*. Subsequently the Doctor and Daraga excavated a burrow and found the owner at home. "The animal appeared very much alarmed and astonished when it was hauled out of its subterranean dwelling—that is, if so paradoxical a creature could look surprised at anything. . . . When I held the Platypus in my hand, its little bright eyes glistened, and the orifices of the ears were expanded and contracted alternately, as if eager to catch the slightest sound, while its heart palpitated violently with fear and anxiety."

This specimen, a female, after a few days of semi-captivity, escaped; but valuable observations on its habits had been made. The Doctor, first attaching a good length of cord to one of its hind legs, gave the duckbill a swim. "It was exceedingly lively, swam in the centre of the stream, dived, and appeared in excellent health and spirits. . . . On diving, it sank rapidly to the bottom, roved about there for a short distance, and then rose again to the surface; it ranged the banks, guiding itself in its progress according to the tactile impressions received by the mandibles, which appeared to me to be used as very delicate organs of touch." The animal frequently sought food in the mud, the movements of its mandibles being the same as those of a duck when dibbling. After a meal, the Platypus would sometimes lie down on the grassy bank of the stream, or recline partly in and partly out of the water, combing and cleansing its fur coat with the claws of the hind feet.

Dr. Bennett was consoled for the loss of this, the first Platypus ever to be even partially tamed, by the capture of two young duckbills, found in a burrow 35 feet in length. When the end of the burrow was reached, the excavators heard distinct growling sounds. These continued, but the furred growlers made no attempt to escape. There were two of them, a male and a female, each 10 inches in length from the end of the bill to that of the tail. "They had a most beautiful, sleek and delicate appearance, and seemed never to have left the burrow. The nest, if it may be so termed, consisted of dry river-weeds, the epidermis of reeds, and small dry fibrous roots, strewn over the floor of the cavity, which was of sufficient size to contain the mother and her young."



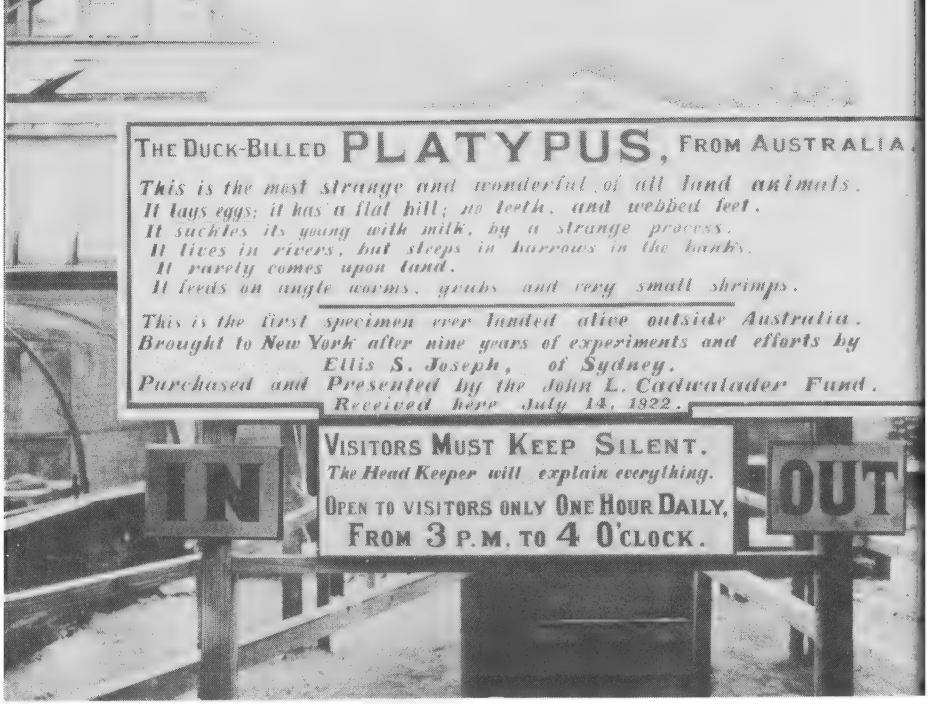
Platypus in her nest (Harry Burrell Collection).—(*Photo. Australian Institute of Anatomy*)

The two little *mallangongs* were so plump that the eyes of Doctor Bennett's aboriginal helpers glistened and their mouths watered when they saw them. "Cobbong fat," they exclaimed, and "Murry budgerree pafta" (Very good tucker). The blacks were sorely tempted when left in charge of the animals, but brought them safely to the homestead, and were liberally rewarded with tobacco. The young ducksbills, which soon became tame, made delightful pets. The Doctor had secured another adult female, and thus had a Platypus family, which he took with him to Sydney, where they survived for some time. Dr. Bennett was proud of his "little family of Ornithorhynchi," and gives a charming account of the young ones, in his *Gatherings of a Naturalist*:

"The little animals appeared often to dream of swimming, for I have frequently seen their forepaws in movement as if in the act. If I placed them on the ground during the day, they ran about seeking some dark corner for repose; and when put in a dark place, or in a box, they huddled themselves up as soon as they became a little reconciled to the locality, and went to sleep. . . . They usually reposed side by side, looking like a pair of furred balls, and surly little growls issued from them when disturbed; nevertheless, when very sound asleep, they might be handled and examined without evincing any signs of annoyance. One evening both the little pets came out about dusk, as usual, and ate food from the saucer, and then commenced playing, like two puppies, attacking each other with their mandibles, raising their forepaws, and tumbling one over the other."

It made the Doctor smile to see his strange pets open their bills and yawn, at the same time stretching out the forepaws and extending the webs to the limit. The little creatures proved to be climbers, sometimes reaching the top of a bookcase. One was observed in the act. Supporting its body against the wall, and placing its feet against the bookcase, the Platypus, by means of the strong cutaneous muscles of the back and the claws of its feet, rapidly climbed to the top. These famous young "water-moles" died within a few days of each other, after nearly five weeks of semi-captivity. Their owner was sorrowful, and he also regretted that the ladies of England "had lost an opportunity of beholding these really 'darling little ducks' of quadrupeds."

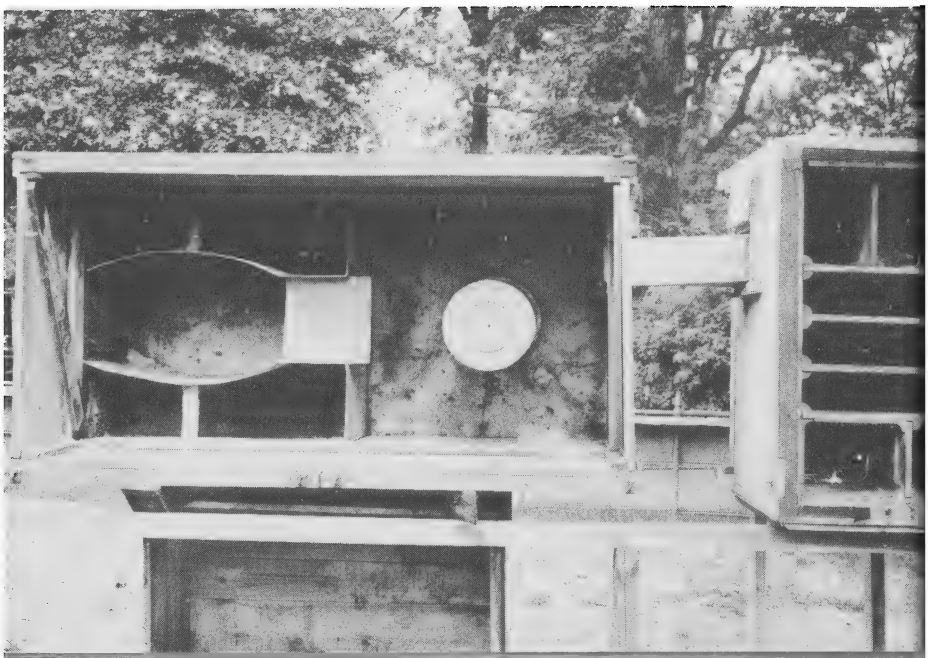
The "ladies of England" must come out to Australia if they wish to see a living Platypus (many of them did see "Splash," of "Glen Eadie"). Only one specimen has been exhibited alive overseas at Bronx Park, New York's Zoo. The credit for getting it



Above: The sign that marked the Platypus exhibit at The Zoological Park, New York.

Below: Looking down into the Platypussary in which a Platypus was transported to America.

(Photos, New York Zoological Society)



safely across the Pacific belongs to Ellis Joseph, while Harry Burrell deserves most honorable mention, for he designed the platypussary in which the distinguished little passenger lived during the voyage, and also instructed the noted animal dealer in methods of feeding and caring for the Platypus. Joseph, having obtained permits from the Commonwealth Government, sailed from Sydney with five male animals in May, 1922, and arrived at San Francisco on June 30, with the first Platypus to leave its native shores and reach another land alive. Its four companions had died during the voyage. New York Zoological Society was proud of the triumph such as no other overseas Zoo has achieved to this day. Being a Corresponding Member of that great Society, the author was deeply interested in the unique event. The full story was told by Dr. W. T. Hornaday, in the Society's *Bulletin*, from which the following paragraphs are quoted:—

"No matter what evil fate may hereafter overtake the Platypus species, nothing can rob us of the fact that New York has looked upon a living *Ornithorhynchus paradoxus*, and found it mighty interesting. It cost us $1400, but it was worth it. . . . We hoped that it might live for a week, but we resigned ourselves to the impending loss. It lived at the Park for forty-nine days, and was on exhibition daily for one hour. . . . The exhibition of the Platypus was accomplished by removing the wire-netting tops of the contraption, admitting visitors in a line, in single file, and permitting them to pass entirely around the man-made habitat of the animal (the platypussary designed and made at Sydney). As the stream of visitors marched and counter-marched, the Platypus briskly swam and emerged, scrambled, and climbed up the wire-netting walls of its main salon in efforts to get out."

Its food habits and aquatic habits made the life of its keeper a burden. The only kinds of food the wonder animal would consider and consume were angle worms, very small shrimps, wood grubs (the scarcest kind), oysters, and water insects: these items on the menu are named in the order of their acceptability. "While it lived, our little Platypus—about half-grown—cost us between $4 and $5 per day to feed. Even in summer the food problem kept us moving, but we looked forward with apprehension to the horrors of winter."

Australians are fortunate in being able to see the Platypus in its native haunts, and also in captivity: at the Sir Colin Mackenzie

Sanctuary, Healesville, Victoria; at Melbourne Zoological Gardens, and Taronga Park, Sydney. When the late Lord Northcliffe visited Australia, he was anxious to see a living Platypus, and the author was consulted about the matter. "Splash" had not even been thought of them; no Zoo possessed a Platypus. And Lord Northcliffe declared that he could not spare the time for a bush excursion. But for Harry Burrell, he would have left Australia with his wish ungratified. Just before the liner on which Northcliffe was returning to England sailed, Burrell was able to show the newspaper magnate a living "water-mole."

Savants and philosophers of a hundred years ago argued about the Platypus, which was beyond their understanding. A modern philosopher, confronted by the wonder animal, semed but mildly interested, and expressed no surprise. The author of this book was standing beside him when the late Sir Oliver Lodge looked for a minute or two at a live Platypus exhibited in the Wilson Hall, University of Melbourne. The occasion was the Melbourne meeting of the British Association for the Advancement of Science, in 1914. Few of those who saw it realised that the Platypus was the real "star" among all the specimens exhibited at that historic gathering.

NESTING BURROW AND NURSING WAYS

That the "water-mole" excavated nesting-burrows in the banks of rivers and creeks was well known to the early colonists, but the first description of one was not published until 1832—that by an officer of the 39th Regiment. Three years later, Dr. George Bennett described the burrow, in the *Transactions of the Zoological Society of London;* giving a more detailed account of several burrows in his book, *Gatherings of a Naturalist,* published in 1860. But, as Harry Burrell points out, the Doctor, owing to the fact that he adopted the aboriginal method of laying them open, did not follow the burrows to their full length, thus missing several important features in structure. These are fully described by Burrell, who made notable discoveries, not only concerning its nesting-burrows, but also respecting the life-history and habits of the Platypus itself. He gives credit, however, to James A. Kershaw, former Director of the National Museum, Melbourne, for having published the first adequate account of the nesting-burrow (*Victorian Naturalist,* vol. xxix, No. 7, November, 1912). Kershaw twice visited the Hopkins River, in the Western District of Victoria, with the object of obtaining very young specimens of the Platypus, or the eggs: he secured both, and besides, carefully examined a number of burrows in the river banks, some twelve miles from Mortlake.

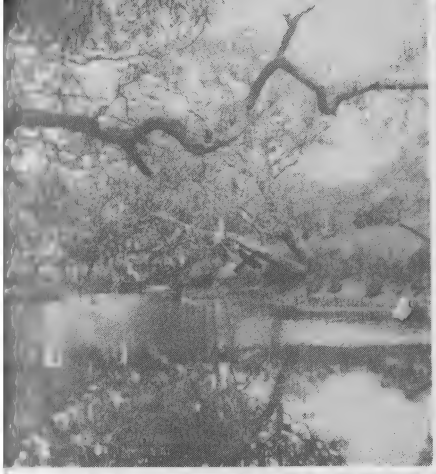
"The river at the spot visited," writes Kershaw, "is a fairly broad, quiet stream, winding about through an extensive grassy flat, margined and shaded with large old red gum trees. The banks in places are steep; in others they slope rapidly to the water's edge. At the time of my visit the river was low, but when in flood it rises fully ten or twelve feet. After a careful search along the banks, several burrows were located, places where the soil is easily worked being usually selected. The entrances to the burrows, when once seen, may always be easily recognised. In every instance these were

situated some feet above the level of the water, varying from four to fully twelve feet above the present level. In no case did the burrows open out below the water, though during heavy floods several of those seen would certainly be covered. In nearly every instance there was an opening to the surface, higher up the bank, and in one case a double opening was found in the same burrow—one immediately beyond the other—the narrow ridge of earth separating the two holes being worn smooth, as though the animal, when passing up, came out of one and immediately entered the other. These surface holes are probably for use during flood times, when the entrance is under water. . . .

"The entrances to the burrows varied from four to five inches wide and three inches high. They are always arched above and quite flat below, following the shape of the animal's body. This form is followed throughout the whole length of the burrow, though the latter may be enlarged here and there. The entrance is occasionally blocked up with earth. The burrows do not follow a direct line, but wind about, at times very considerably. They always follow up the slope of the bank, parallel to and rarely more than a foot below the surface. In no instance was one found deeper than fifteen inches, while here and there they approach within a few inches of the surface. A short branch, from one to three feet long, is frequently made on either side of the main burrow; in one instance four were seen—two on either side. These end abruptly without any apparent cause. Although in the same class of soil, the length of the burrow varies, the shortest examined being ten feet, and the longest, carefully measured, thirty-five feet. While usually terminating in the nest-chamber, the burrow is occasionally continued beyond the nest for a foot or two."

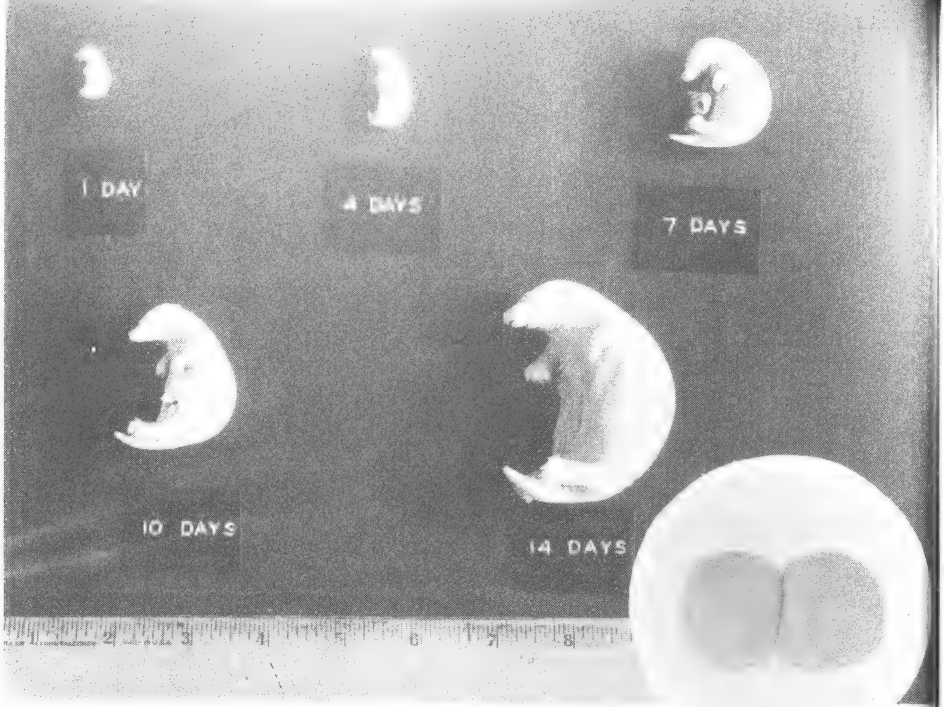
Kershaw was the first to note that, when the burrow is occupied, it is completely blocked with earth for about one foot. In one burrow examined, this occurred in three places, the last within a yard of the nest. These plugs, Burrell states, are tamped into position by the animal, with the tail, prior to her retirement to the nest for the purpose of laying and incubating the eggs. No soil is ejected from the burrow: as the Platypus digs its way into the earth, the loose soil is tamped or consolidated so that none accumulates outside in the form of a tell-tale mound.

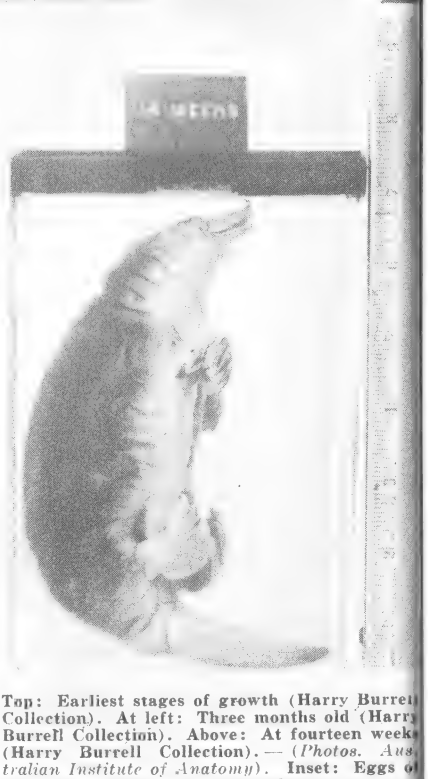
Large stones and roots often are passed over, resulting in the burrow being brought very close to the surface. But when an insurmountable



Above left: The Hopkins River, at Hexham, Victoria, showing site (x) of a Platypus burrow. —(*Photo. R. A. D. Hood*)
Above right: Entrance to a Platypus burrow.—(*Photo. Morwell Hodges*)

At left: Nest of a Platypus *in situ*.—(*Photo. J. A. Kershaw*)
Below: Female Platypus in nest.—(*Photo. J. Ramsay*)





Top: Earliest stages of growth (Harry Burrell Collection). At left: Three months old (Harry Burrell Collection). Above: At fourteen weeks (Harry Burrell Collection). — (*Photos. Australian Institute of Anatomy*). **Inset: Eggs of**

obstacle is encountered, the Platypus will excavate beneath it, sometimes to a depth of four feet; then the burrow rises abruptly to the former level. In some instances, the obstacle is by-passed, the burrow being carried around one side. Occasionally, when excavated during a period of very low water in the stream, a burrow will have its entrance right at the water's edge. Though a rise in water level partially or wholly submerges the burrow, the animal continues to use it. Sometimes the entrance is fairly well concealed by overhanging vegetation, but often enough cover is completely lacking: apparently no actual attempt to camouflage the opening is made.

A Platypus nesting-burrow has been known to reach one hundred feet in length—the record; the average probably is between twenty-five and thirty feet. Burrell considers from fifteen to twenty feet to be a fairly adequate length. The resting burrows, used only by non-breeding individuals, are less elaborate than nesting-burrows.

It seems highly probable that the female Platypus remains in the nesting chamber from the time the eggs are laid until the young are being suckled. If she does leave the burrow occasionally, she must dig through the plugs, and replace them on returning home. Their object may be, as Kershaw suggests, protection against flood waters, should the river suddenly rise, or from possible enemies. Rounded in form, the nest-chambers measure on the average about thirteen inches in width and a foot in depth. This cavity, the floor of which is much lower than that of the burrow itself, is lined with fine grass and gum leaves to form a bulky nest; the top layer, consisting of leaves, and several inches deep, is continued up the walls of the chamber, in some cases arched over so that a circular nest is formed, with an opening in the side opposite the burrow. The quantity of gum leaves used is considerable; and as the Platypus is able to carry only small loads, she must make many excursions while engaged in nest-building.

Though gum leaves nearly always are used, there is some variety in nest-material. Thus the famous Burrell Collection includes a nest constructed of willow rootlets and reed leaves; another, of couch grass stems with a few gum leaves; while a third is made entirely of river-reed roots. A nest examined by Kershaw completly filled the cavity at the end of the burrow; it was composed of gum leaves with a small layer of grass on the floor of the chamber. The interior of the nest measured six inches across and was four and a half inches deep.

The Platypus lays two eggs, which firmly adhere to each other, and thus are prevented from rolling out of position in the nest. Rarely three eggs form the clutch, while occasionally there is only one. Nearly as large as those of a pigeon, Platypus eggs resemble those of reptiles in having a soft, parchment-like shell which is very easily dented, and has a tendency to become shrunken. Almost round, the eggs are glossy white when newly laid, but soon become brownish or of a drab yellowish-white colour. The mother Platypus does not sit upon them bird fashion, but holds the eggs snugly against her body, the tail being turned up over it. Burrell was fortunate enough to find a Platypus in this curled up position, holding against her abdomen two tiny young ones. He is convinced that the eggs also are held during incubation in a somewhat similar manner; the same opinion is expressed by other students of the Platypus.

Newly hatched young are attached firmly to their mother's skin: she does not possess a pouch, nor even a defined fold of the skin which might serve the same purpose as that characteristic feature of marsupials. But the Platypus embryo is extremely small, and coiled up in the same manner as a newly-born kangaroo. Of the duck-bill there is no sign in the embryo. For some days after birth, as proved by Burrell's observations, the young ones are not suckled, because the mother's milk glands are not yet functioning. These glands, when excited by the young, exude the nourishment of milk through the skin, and it is lapped up by the babies. When that is accomplished, there is no visible evidence that the Platypus is a mammal: a most extraordinary characteristic of this strange animal.

The nest is always clean. Burrell maintains that the Platypus becomes lethargic when brooding, and therefore requires little food. She does, however, leave home occasionally to feed, and doubtless this explains why the nest is not fouled. When about six weeks old the young have grown to a length of twelve inches, while their fur is a quarter of an inch long, according to Burrell's observations. Their eyes are open and they move around freely in the burrow. The twins captured by Dr. George Bennett were only ten inches long, yet they were handsome little creatures, fully furred, of a sleek and delicate appearance, and seemed never to have left the burrow.

All attempts to rear very young "water-moles" have failed. Various methods of artificial feeding have been tried; such as squeezing cow's milk upon the little creatures' muzzles. Until fairly well grown, the young Platypus is a helpless subject when removed

from the care of its mother. Kershaw placed in cotton-wool two exceedingly small young ones fresh from the nest, wishing to take them alive to Melbourne. They lived only for about twelve hours.

Only once has the Platypus bred in captivity. At the Healesville Sanctuary, early in January, 1944, the Director (David Fleay) discovered that "Jack" and "Jill" were parents. The notable event was announced by A. H. Chisholm, in the Melbourne "Herald," and from his article the following paragraphs are quoted:—

"Promising indications in October caused Mr. Fleay to place nesting material in and near the water of the 'platypussary'—an oblong structure, comprising a swimming pool and earthen burrows. 'Jill' immediately seized on the wet gum leaves and grass, tucked them into her tail, and carried them into a burrow. On October 25 she disappeared into the burrow and did not emerge for six days. Wisps of grass placed over the entrance revealed that she did not come out to feed even at night. Presumably that was the period required for the incubation of the eggs. . . . Previously, it had been supposed that the incubation period was nearly a fortnight.

"During the time of 'Jill's' retirement, 'Jack' was transferred to another apartment. No risks of disturbing the brooding mother were taken. When 'Jill' emerged again she stayed out for only half an hour. Later, however, she remained outside for longer periods, and meanwhile made up for lost time with food. In one night (December 13) this small animal actually disposed of 1¾ lb. of food, including the following dainties: worms 400, chafer grubs 338, and yabbies 38. By this time Mr. Fleay had become convinced that Jill was stimulating her milk supply for the benefit of one or more young. He refrained, however, from opening the nesting burrow until yesterday (January 3rd), then to his delight he found a fat little baby platypus. Apparently about nine weeks old, it was still sightless and helpless, but it uttered a series of quaint little puppy-like barks. 'Jill,' on her part, eddied around in agitation, uttering the excited growling of the adult platypus.

TAMING THE PLATYPUS

Dr. George Bennett succeeded in keeping two young ones alive for five weeks; at Healesville's Wild Zoo, a Platypus has lived for more than six years. Bennett was the pioneer tamer of the shy "water-mole," as he liked to call Ornithorhynchus; and his observations will never lose their interest, nor their value. His successors have revealed many secrets of Platypus life, but they honour the memory of a grand old naturalist whose gatherings in Australia made a notable book that must be read by every student of the monotremes.

The Doctor's paradoxical pets appeared to him to be as playful as puppies and as tame as kittens—though much less graceful in their playabout, which included mock fights. Burrell, however, is doubtful whether the young duckbills actually were playing. He thinks it more probable that their so-called engaging antics "were really the desperate struggles of slowly starving nestlings." But consider the playfulness of "Splash," once he had gained confidence in his owner.

Harry Burrell, when the author first met him, was interested chiefly in bird life. Later he turned his attention to the Platypus, and devoted years to its study, supplementing field work by work and study at home, where he designed and constructed the first platypussary, and made, by means of an ingenious glass tank, underwater observations on his favourite animal. His great book, *The Platypus*, is the result of nearly twenty years' personal observation of the wonder animal in its haunts, while he was collecting specimens for the University of Sydney, and the Commonwealth National Museum at Canberra. Burrell's unique Platypus Collection—a gift to the nation from the man who formed it—is preserved at the Institute of Anatomy, Canberra, where the author examined it while the Director, the late Sir Colin Mackenzie, explained the significance of numerous specimens. Sir Colin remarked that the

collection had been coveted by many museums and universities overseas. It was of the greatest value and interest. A wealthy American visitor once proffered a blank cheque, telling the Director to fill in whatever amount he pleased as purchase price for the collection! It was not for sale at any price; and Australia was fortunate enough to retain it, owing to the generosity and patriotism of Harry Burrell.

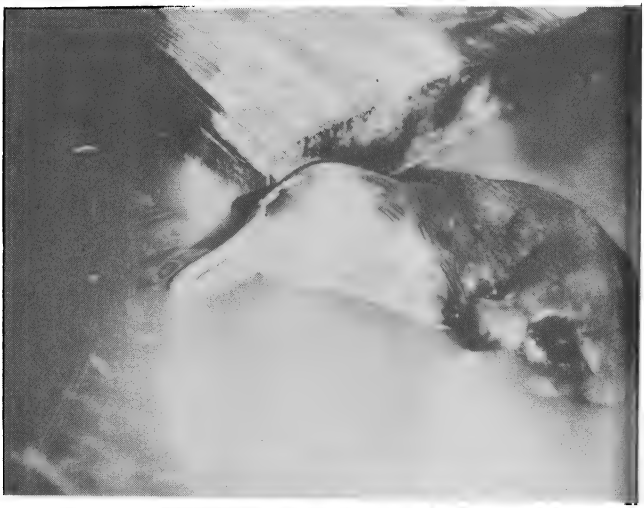
Burrell tells us that he fell in love with Platypus at first sight. He had settled at Manilla, on the Namoi River, New South Wales, in 1901, and kept a variety of marsupials and birds in a small private zoo. He resolved to add a Platypus to the collection, but it was not until 1910 that he made the first attempt. Adequate food supply was the problem. "Biddy," sole survivor of five animals in an enclosure which foreshadowed the famous Burrell platypussary, escaped after more than nine weeks of captivity.

This pioneer experiment had revealed the secret of success. Burrell set to work and designed an ingenious, portable artificial habitat which he called a platypussary. The original design was improved upon, and in 1910 Harry Burrell, by means of his platypussary, placed on view at Sydney Zoological Gardens (then at Moore Park), the first living Platypus to become a Zoo animal. One specimen lived in the enclosure for three months. Subsequently, as related in an earlier chapter, five "water-moles" were shipped to New York Zoo in a Burrell platypussary, and one survived to become historic—"the first Platypus that ever left Australia and landed alive on a foreign shore," to use Dr. Hornaday's words.

Some ten years ago, after observing the Platypus in the rivers of Healesville district, Victoria, Robert Eadie became deeply interested in the possibility of keeing the wonderful little animal in captivity for "the term of its natural life"—after capture. He made the effort and met with success, though whether the famous "Splash," when he died, had lived Nature's allotted span for his kind remains uncertain. He had several predecessors, but they were tenants of an enclosure in the Sir Colin Mackenzie Sanctuary, while "Splash" lived in a platypussary at his owner's residence, "Glen Eadie," some distance away.

The Sanctuary enclosure was circular, having a diameter of about ten yards. Inside the corrugated iron fence—six feet high and two feet in the ground—and around its circumference, a channel was excavated into which the water of the adjoining Badger Creek flowed continuously. Inside this channel the earth was built up

"Splash" enjoys little rest after p ing the "mop gam —(*Photo. Morwell Hodg*



"Splash" combs his fur.—(*Photo. Morwell Hodges*)

Front-feet as we hind-feet are us fur cleaning and ing.—(*Photo. Mo Ho*

to form an island about five feet high. Logs and stones and plants were placed so as to simulate a river bank.

When a Platypus three or four months old was released in the enclosure, he at once commenced to honeycomb the island with burrows. He was very shy, and for a few weeks seldom appeared in the open. Only worms, grubs, and tadpoles were acceptable by the little captive; and as the dry season advanced these became very scare. Other kinds of food were offered, but prawns alone were approved of by the animal, and soon he refused even these. The worm supply was quite inadequate; and after one hundred and eighty-two days of captivity, "Glennie" the Platypus died, almost certainly from an insufficiency of the proper kinds of food.

But "Glennie" had not lived at the Sanctuary in vain. He had created great public interest, and also provided much useful data for future experiments. Robert Eadie designed a construction with little retreats and passageways, which would give its tenant the opportunity to settle down and eventually become accustomed to this type of home. A young Platypus, destined to become famous as "Splash," was domiciled in these premises.

The author is indebted to Mr. H. Kendall, B.V.Sc., Director, Zoological Gardens, Melbourne, for the following notes:—

Over a number of years attempts were made to keep a Platypus at Melbourne Zoo, but, as no suitable enclosure was constructed until 1934, very little success was obtained. One notable specimen was "Percy," a male, who was placed in what was then the large finch aviary, with a pond and bamboos. After living there for some considerable time, although no place of escape could be found, he completely disappeared, and was never seen again. In 1934, a platypussary was constructed on the same lines as that at the Sir Colin Mackenzie Sanctuary, Healesville, then under the control of Mr. Robert Eadie. It represents, as nearly as possible, the natural habitat of the Platypus. Of course, to make the inhabitant secure, the water pond had to be reconstructed of concrete, and the tunnels and sleeping dens of wood. The pond is about 24 feet long by 6 feet wide and 9 inches deep, the sides being built up with boards to the length of 18 inches. At each end there are two half-round openings leading into tunnels which connect to the sleeping or hiding dens. These dens are filled with meadow hay or straw. The pond has an overflow outlet so that the water can be left running continuously.

Since this platypussary has been constructed, much more success has been obtained in the keeping of these extraordinary animals. "Binghi" was the first to show that, in these conditions, there should be no difficulty in keeping a Platypus for the full life's span. "Binghi" was brought to the Gardens (age unknown) in March, 1937, and lived until the end of January, 1942, or five weeks short of five years. "Barwon" arrived (age unknown) on March 14, 1937, and died on the same day as "Binghi," having lived in captivity for nearly five years. This was a record for a Platypus in captivity until "Jill," who is still flourishing at the Badger Creek Sanctuary, Healesville, beat it by passing the five years' mark in February, 1943. She was a few months old when found, wandering along a road some distance from the nearest water.

Sir Colin Mackenzie's researches on the anatomy of the egg-laying mammals, and of marsupials, are notable. He founded the Institute of Anatomy at Canberra, and was its first director. The Sir Colin Mackenzie Sanctuary, Healesville, was so named because the area was selected by Sir Colin, in 1921, for the purpose of anatomical research on the Platypus, Echidnas, Koala, Wombats, Possums, and other native animals. Eventually the area came under the control of the Healesville Shire Council, Robert Eadie being honorary curator. Victoria's world-famous Wild Zoo now is controlled by a committee of management, with David Fleay as the Director.

STORY OF "SPLASH"

"Splash," the Platypus, will always be remembered though his record of long life in captivity has been broken by three other "water-moles." None of these rivals, though popular enough, has enjoyed the fame that was "Splash's" during the latter part of his life. Being dead, he yet lives—in the memory of thousands who delighted in his quaint and playful ways. He was a lovable little fellow.

When taken into captivity, on February 11th, 1933, "Splash" was between three and four months old, and measured fifteen inches in length. He was on a walk-about when found, about thirty yards from the river, and had seemingly lost his bearings, for he was wandering about in a patch of maize. Two days later he was taken to Robert Eadie, who released him in the platypussary already described. The timid animal at once disappeared through one of the exits into a box at the end of the construction. He was left undisturbed, but four ounces of worms, in a dish, were placed in the water tank. They were not eaten. Each evening fresh worms were placed in the dish, but not until the eleventh day did the captive take any food.

Robert Eadie, fearing that it would die of starvation, was on the point of releasing the animal in the river when its hunger strike ended. Very soon an astonishing appetite was developed, and how to satisfy it became the problem. The long fast caused no sign of distress or weakness. Evidently, a Platypus is able to live well enough for a fairly long period without food. Yet normally it requires daily an amount of its special foods equivalent to twenty-five per cent. of its own weight. Truly a paradoxical creature.

The time came to christen Robert Eadie's now tame Platypus. The ceremony was performed at a dinner party, among the guests being well-known Victorian naturalists. Several names were proposed, "Splash" eventually being chosen as the most appropriate,

"Splash" accepts a worm from his owner.—(*Photo. "The Argus"*
Inset: Robert Eadie.

having regard to the little animal's antics in the water. His birthdays in captivity were celebrated, and on each occasion congratulatory telegrams, addressed to "Splash" himself, were received at "Glen Eadie"; also, presents in the form of tucker were taken to the platypussary. His owner never forgot "extras" on the birthdays, nor at Christmas. "Splash" received Christmas cards and also had one of his own which was sent to special friends, among whom the author was fortunate enough to be included.

After breaking his first long fast, "Splash" took food regularly, but remained very timid for a long time. His confidence was gradually won, by the exercise of great care and patience. At the end of three months he would take food from his owner's hands, and also came to recognise his whistle as being the "dinner bell." Month by month "Splash" became more tractable, even allowing his human friend to stroke him on the back while he was feeding. He liked this so much that he would roll over in order that he might be stroked on the under surface of the body. But this was done with a small mop, the animal having developed a formidable pair of hind-foot spurs.

"Splash" was delighted, wrestling with the mop as if it were an enemy. This was the origin of the mop game, which "Splash" enjoyed, almost until his last day. Frequently he was lifted from the water while clinging with all four feet to the mop. Dropped back into the tank from a height of twelve inches, he would immediately seize the mop again as it was swished through the water. Sometimes he clung to it so tenaciously that he could be swung, pendulum fashion, for nearly the length of the tank. This was possible only when the spurs had a firm grip high up on the mop.

Much as he enjoyed these frolics, "Splash" would indulge in them only after a fairly good meal. His daily ration was sixteen ounces of worms and grubs (larvae of wood-boring moths and beetles), and two pulped eggs in the evening. Often tadpoles were added to the menu. During his four years of pleasant captivity, "Splash" consumed nearly three-quarters of a ton of worms and about two hundred dozen eggs. Tadpoles were always relished, as extras, and many thousands of them were fed alive to "Splash," who enjoyed chasing them. The egg-mixture was served in water in a tin vessel placed in the tank, its edges standing a few inches above the surface, to prevent the food from being scattered all over the tank. Thus the Platypus had to scramble over the edge of the tin to reach its tucker.

The discovery of the egg diet was important, in view of the great difficulty experienced in obtaining worms in sufficient quantities, especially in summer-time. The mixture was prepared by beating the whole of each egg into a batter and boiling the mass until it assumed the consistency of custard. Now "Splash" was temperamental, and sometimes he not only refused to eat the egg-flip, but showed his bad temper by tossing it over the sides of the tin into the tank; much as a pig tosses out with his snout unwanted food from a trough. This would happen when egg-food was offered first instead of worms: when they were produced, "Splash" at once became amiable again, and ate greedily.

Concerning food consumption and means of obtaining food, Robert Eadie writes: "The Platypus has an insatiable appetite. He requires at least twenty per cent. of his own weight in food to keep him in good bodily condition. He could and would eat a great deal more were it offered. It is possible that the animal would consume quite thirty per cent. of its own weight in feed were it available. If any person is tempted to try to keep one of these creatures it might make him pause in this ambition if the cost be counted. In any case, permission is steadfastly refused by the authorities, except in special circumstances, such as Sanctuaries. The total cost for worms and tadpoles consumed by "Splash" was £115. If the eggs were valued at one shilling a dozen, another £10 must be added.

"It will readily be seen that some kind of organisation had to be adopted in order to procure such an extensive diet. Further, this diet had to be obtained from day to day. Worms are not easily kept alive after being removed from the earth. It was difficult to obtain a regular supply, and one was usually in a state of anxiety as to whether the daily requirements would be forthcoming. Some of the suppliers were very casual, and the only time that they could be depended upon was on those (too frequent) occasions when they were short of money. However, it is worth recording that there was one very old aboriginal lady, come wet, come fine, who was at "Glen Eadie" at 9 o'clock each morning with her quota. She always had the best quality of worms. They were probably obtained from rich soil along the river banks. Like most other things, there is quality in worms—good and bad. Some are of high food value while others are poor attenuated specimens reflecting the soil from which they were unearthed. It is generally agreed by students of the Platypus that mud is found in the stomach, and in some quantity.

But what value as food does it possess? Mud was not supplied to "Splash"; nor do I believe that it is an essential item in the dietary of the Platypus. Definitely the animal in captivity thrives remarkably well without mud."

"Splash" slept during the most of the day, appearing usually late in the afternoon, for his food. During very hot weather, however, when his sleeping quarters became too warm for comfort, he would sometimes emerge to enjoy a swim in the cool water in the tank. On most evenings he spent much time in his "exercise yard," and there combed nearly all the water from his fur before retiring —always to the same sleeping-box, though he had the choice of three boxes. When disturbed in his sleeping quarters, "Splash" usually uttered a growling sound resembling that made by a broody hen. But, once his confidence had been gained, he seldom protested in this manner, but rather enjoyed being handled by his devoted friend. He recognised a stranger's hand immediately, and showed marked displeasure. Many people might admire him and watch his antics in the tank; but it was always a case of "Hands off!" In Robert Eadie, whose very footstep he seemed to recognise, "Splash" had complete confidence. That great naturalist-traveller, the late Cherry Kearton, told the author, who had taken him to "Glen Eadie" to see the only tame Platypus, that he knew of no other friendship between man and animal as perfect as that between Robert Eadie and "Splash."

Only once did his owner see "Splash" infuriated. A number of people had gathered round the platypussary at the usual hour for exhibition. After a little persuasion, the Platypus left his sleeping-apartment and glided into the water as usual; but instead of eating, he swam very rapidly round the tank, with an occasional fierce peck at a worm. All his friendliness had gone: he would neither feed out of his old friend's hand or nuzzle his fingers. When a hand was placed on his back he made a swift thrust at it with one of his hind legs.

"I have seen reptiles strike," says Robert Eadie, "and I imagine that the action of the Platypus is of equal speed. The spur just touched the skin of my hand, but did not lacerate; it was just short by a fraction. For over half an inch along the line where the spur had traversed the skin, there was a small quantity of fluid which had been ejected from the spur."

When his play-mop was swished in the water, "Splash" struck at it savagely, several times, with his spur. The movement apparently

is started by the tail. "For an instant there is a distinct crouch, then, like a flash, the tail and body appear to be thrown at the object. The impetus from the tail seems to be the prime factor in bringing the body into action. In tests that were made, it was necessary that the attack should be made in a sideways position. The leg on the attacking side was raised, and an arc was described when the Platypus projected itself with such force that it was evident that every ounce of its weight was put into the attack."

When "Splash" was provided with a companion, instead of welcoming the newcomer, he attacked it immediately in the manner just described. The victim of this unprovoked assault was at once removed from the tank, but it died soon afterwards; either as a result of its savage reception, or from other cause.

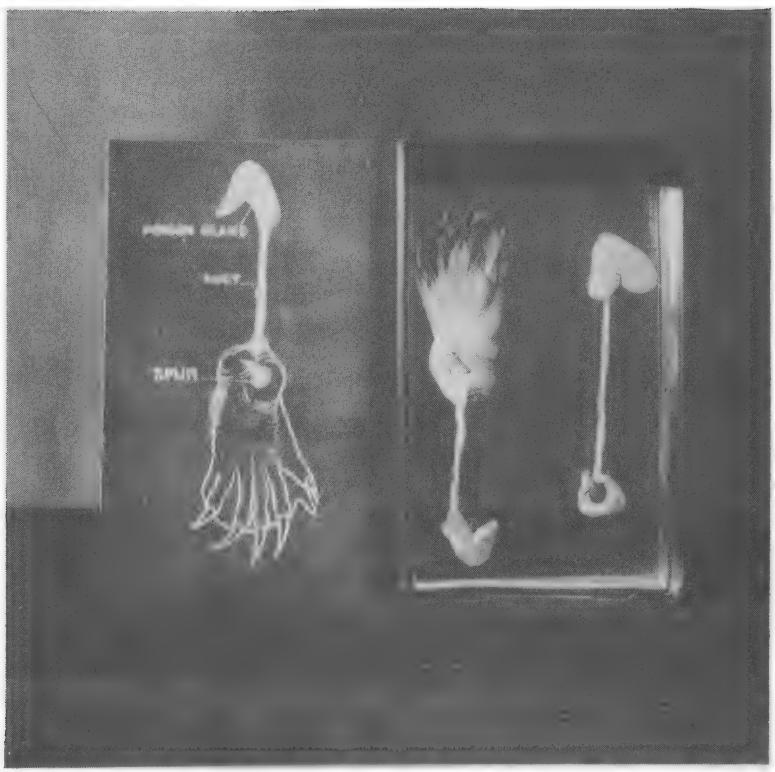
That the male Platypus is capable of inflicting severe wounds with its spurs has been proved. A friend of Robert Eadie's was attacked by one of the animals, which he hooked when trout fishing. When he seized it with his left hand, with the object of freeing it, the Platypus clasped both hind feet to his wrist, and plunged each spur into the flesh. Poison, of course, was injected into the wounds, and soon swelling of the arm, accompanied by intense pain, resulted. The angler suffered greatly for twenty-four hours, when came some relief; but for nearly a week he felt the effects of the poison. Though in the young there is evidence of the presence of spurs in both sexes, the male alone retains them, developed into formidable weapons.

At the end of three years, "Splash" had become as tame as a kitten, and very playful. He had given delight to thousands of people, who had seen him in frolicsome mood. Very many of the visitors to "Glen Eadie" came from overseas, among them being Americans. When he had enjoyed a good meal, "Splash" would always engage in the mop game with the utmost abandon, stopping occasionally for a rest, and to be petted and stroked by his master. He liked to have an audience, and would continue to give a display of his gymnastic abilities while there were spectators; immediately all had departed, he would retire to his sleeping quarters.

During the last twelve months of his life, "Splash" remained good tempered and good natured. His liking for publicity seemed to increase. His pleasure in admiration was obvious: he might have been a film star in fur. When "Splash" died, in March, 1937, not a month after his fourth birthday as tenant of the platypussary, no animal in the world was more famous. More than twelve thousand

people had visited "Glen Eadie," and seen "Splash" in his swimming tank. On the very last day of his life he was admired by nearly one hundred visitors from Melbourne. The body of "Splash" was sent to the Australian Institute of Anatomy, Canberra, where it was preserved and became a notable addition to the Burrell Platypus Collection.

There never can be another "Splash," for he was not only a contented captive: he was tamed and trained to perform before large audiences for whole afternoons, and enjoyed it.



Illustrating the poison apparatus of the Male Platypus (Harry Burrell Collection). *(Photo. Australian Institute of Anatomy)*

THE PLATYPUS MAN'S DISCOVERIES

"Splash" repaid all the care and attention received from his master by revealing to him secrets of Platypus life, besides being a friend and a wonderful pet.

Robert Eadie's most notable discovery was the fact that the Platypus undergoes periods of hibernation. It was in the winter that "Splash" became dormant, but not during unusually cold weather. He had been in captivity for exactly one hundred days when he caused his master grave anxiety. He had failed to appear at the usual time, so his sleeping quarters were opened, and there he was found apparently in a dying condition. He was taken indoors and placed in a box containing straw, near a fire. A hot-water bottle was put into the box to help things along. In about fifteen minutes, "Splash" was making frantic efforts to escape; so he was returned to his quarters, a much livelier animal now. In the evening he ate his usual allowance of food. A week later, however, he was again found in a dormant condition; and this time was left undisturbed. His owner thought that it might be hibernation. After seventy-two hours, the animal appeared in the tank and consumed more than one pound weight of grubs and worms. Another seven days of normal life, and "Splash" again lost all interest in his little world. This time he remained in seclusion for seventy-four hours. The final period of hibernation commenced a fortnight later, and lasted for one hundred and twelve hours. It was a very hungry Platypus that reappeared in the swimming tank one Saturday afternoon.

Strangely, this behaviour was not repeated by "Splash" in the following winter; but a Platypus in the Sanctuary retired to his burrow during June and July for three hibernation periods of about seventy-five hours each. Partial hibernation, then, evidently is a normal habit in our paradoxical mammal.

Most animals, including ourselves, have likes and dislikes in the matter of colours—as in foods and other things. Robert Eadie discovered that the Platypus, judging by "Splash's" behaviour, has a strong dislike for blue—the satin bower-bird's favourite colour, by the way. Among the many groups of people who paid a visit to "Splash," of course, there usually were some ladies, whose costumes displayed a wide range of colours. At times, while his pet was on view, Robert Eadie was surprised at the startled movement and rapid dive made without apparent reason. But a reason there must be for this behaviour, and in time it was discovered. One afternoon, when "Splash" made his plunge, the Platypus Man, looking up instantly, noticed that a woman wearing a bright blue costume had made an unexpected movement.

On two other occasions, "Splash" showed his aversion to ladies in blue—or rather of the colour of their clothes, by diving in disgust or alarm. Women alone wear bright blue clothing—at least, very few men would dare to do so—and never when men only were present around his tank, did "Splash" act in the manner described above.

The vision of the Platypus along a horizontal plane, Robert Eadie has proven, is so hopelessly defective, that very little is observed by the animal on the surface of the ground. This is the reason why a Platypus wandering some distance from the river becomes lost. It does not possess the mysterious sense which guides baby turtles, for example, from the nursery site above high-tide mark, direct to the water.

The tail plays a most important part in enabling the Platypus to effect its characteristic rapid movements. Everyone who has scared a Platypus swimming at the surface of the water knows that it can, and does, dive at an astonishing speed. The tail acts as a most efficient rudder, as could clearly be observed while "Splash" was swimming close to the floor of his tank in search of food. "It is while swimming under these conditions," said Robert Eadie, "that the Platypus is seen at its best. The limbs are flattened out and the tail is moving so gracefully as it assists in the gliding-like action of the animal. The head is weaving to and fro and the whole movement forms a delightful picture of grace and form. The animal is a leisurely swimmer; its speed being about forty feet to the minute. I have observed the Platypus removing heavy objects which might be concealing worms or other food. The head and shoulders are forced

in between the wall and the object to be moved. If further purchase cannot be obtained, and if the object has not been transferred to a sufficient distance, then the tail is brought into operation. So long as the water is of the right depth to allow the hind feet to obtain sufficient grip, the tail is turned in sickle-like fashion, and very heavy articles are moved with ease."

Undoubtedly the Platypus possesses a sense of smell. "Splash" knew when a stranger's hand was introduced into his box, for instantly he would show resentment and become agitated; whereas his master's hand was welcomed.

Does this extraordinary mammal possess some—as yet—unknown sense which enables it to detect certain danger which may menace its existence? The Platypus Man asks the question. He is convinced that there is more in the animal's habit of quietly thrusting a portion of the bill above the surface, after submerging in a fright, than getting a supply of fresh air. "The wary and furtive manner in which the bill is protruded, the silent withdrawal, and the repeated appearances and disappearances, from time to time, suggest to the onlooker that there are other reasons in addition to supplying the lungs with air. It is well known that the Platypus closes eyes and ears while under water, consequently these organs would not serve the animal in detecting danger whilst the bill is exposed." May not the animal be endowed with a specialised olfactory sense enabling it to detect danger and guard against it while portion of its bill is above water? Either that—or an unknown sense.

CATCHING THE PLATYPUS

There are various ways of catching the Platypus. The usual method is to dig it out of the burrow. This is sometimes a gigantic piece of work, for some of the burrows extend to sixty feet, and more. The animal will go deep down in order to pass a huge rock or roots of a big tree. In these circumstances the burrow is often abandoned by the hunters.

In the Healesville district there lived a man, Reg. Stanley, who was very successful in obtaining specimens for the Sanctuary and other kindred places. He was acting under permit from the Fisheries and Game Department. The method adopted was to ascertain the haunts of the Platypus, which not infrequently are in the vicinity of logs which have fallen into the river. When a site had been selected the hunter would take up his position on one of the logs before dark and before the Platypus would emerge from the burrow. The position was a most uncomfortable one, for he would lie prone on the wet and slippery log. His hands and arms had to be in such position that he must be in instant readiness to grasp the Platypus when a favourable opportunity offered. Sometimes he lay on the log for hours before the animals appeared. On many occasions they did not come into the water at all, and the vigil was abandoned. When everything went according to plan, and the Platypus made its appearance, the watcher would wait his opportunity. Like a flash, his hand would shoot out and seize the loose skin of the animal, and all this without injury to the captured. When this occurred he would rise from his position stiff and wet, and place the Platypus in a receptacle. (Robert Eadie.)

Midnight Hunt, Victoria. V. C. Mullett with two young Platypuses, caught after an all-night search at Lake Jumbunga, near Healesville, Victoria. These specimens were sent by aeroplane to South Australia and liberated in a stream in Kangaroo Island.

—(Photo. Herald Feature Service

ENEMIES OF THE PLATYPUS

Provided that epidemic disease does not take toll, as it has done of the Koala and other native animals, the Platypus should continue to flourish indefinitely. It is in no immediate danger of becoming rare, excepting in districts where unfavourable river changes have occurred. Game law protection is effective throughout the animal's range, though some poaching is done in remote places. It was stated some years ago that large numbers of Platypus pelts were still being smuggled out of Australia under false descriptions. However, F. Lewis, Chief Inspector of Fisheries and Game, Victoria, informed the present writer (in January, 1943) that there had certainly been no smuggling of the skins from his State during the past thirty years. The Platypus was definitely on the increase in Victoria.

In the bad old days, trappers and furriers had a free hand, with the result that thousands of "water-moles" were killed for the sake of their beautiful pelts. Platypus rugs were not so rare then, while many women owned Platypus fur muffs, or cloaks, which, in some cases, may not have been costly, because the skins were obtained by husband, sweetheart, or brother.

John Gould, some eighty years ago, predicted the extinction of the Platypus failing strict measures to restrain its human enemies. Happily, prophecy has not been fulfilled, despite the fact that protection was delayed for nearly half a century. In recent years, at least in some of their haunts, "water-moles" have become more plentiful. They have few natural enemies. In New South Wales and Queensland, pythons doubtless account for a small number every year, while goannas, which eat the eggs of mound-nest making birds, may also occasionally dig into Platypus burrows and devour any young ones they find. A goanna could not possibly traverse a burrow.

Above: A haunt of the Platypus in north-eastern Victoria.

Below: Fisheries and Game Inspector with drum-net taken from a Victorian stream. Occasionally a drowned Platypus is found in one of these nets, the use of which is illegal in Victorian waters.

In its real element, the Platypus has but one enemy—the Murray cod, which grows to an immense size, and is capable of swallowing a duckbill at a gulp. The giant perch (the Murray "cod" actually is a perch), however, is a minor menace compared with the fish-traps set to catch the fish itself. Too often a Platypus gets into a drum-net, and is drowned. The use of these deadly "fixed instruments" is forbidden in Victorian waters, but they are not illegal in New South Wales, so that "water-moles" of the Upper Murray, where much of the cod fishing is done, are in constant danger. Poachers set drum nets in some Victorian creeks and rivers. The author once accompanied a ranger on his rounds. Three drum-nets were found near the mouth of one creek, which flows into the Murray. Each net contained a Murray cod. The ranger said that occasionally a drowned Platypus was found in a drum-net.

Rabbits are a serious danger, because thousands of the pests burrow into river banks, and trappers set their cruel steel traps along the riverside. Inevitably, sometimes a Platypus is trapped. The victim doubtless is at once released if still alive, but has a slender chance of surviving its injuries.

Water-rats probably attack and kill the Platypus, but only on rare occasions. The introduced black rat, and its grey variety, are a more serious danger; they have become bush creatures, and, where they are numerous in the neighbourhood of rivers, must be a menace to the Platypus. Rats have been known to kill a Platypus in captivity. Trout fishers sometimes catch a Platypus, and to release one from the hook is no easy matter. The hooking of the "water-mole" occurs more frequently than is generally supposed.

ABORIGINAL PLATYPUS DEITY

Very few of the several thousands of aboriginal carvings known to Australian ethnologists represent the Platypus. One of these is situated in Kurin—gai Chase, not twenty miles from Sydney. It was discovered by the late B. L. Hornshaw, who explained its significance to the author as they stood gazing at the carving on a November afternoon, when the sun-glare from the great sandstone rock was a trial to the eyes. The carving measures about nine feet in length and is deeply cut. This is the discoverer's own description of the unique petroglyph: "The upper portion is shaped like the head and bill of a Platypus. The figure's arms are outstretched; one holds a boomerang, while the other points to the outline figure of a female deity, whose arms are extended upwards." Hornshaw believed that the male figure was intended to represent the totemic deity of the Kuring Tribe. The carving, a photograph of which is reproduced on the opposite page, doubtless represents a Platypus. It measures 3 feet in length and 2 feet 3 inches in width, and is on a rock in Kurin-gai Chase.

Aboriginal rock carving representing a Platypus.— (*Photo. The late B. L. Hornshaw*)

A pioneer in X-raying Australian animals, F. S. Fergus, of Melbourne, made the first radiographs of a Platypus. One of his unique copyrighted photographs is reproduced on the opposite page. In his private research laboratory, Mr. Fergus placed the living X-ray subject on a cold plate where it remained fairly still while three successful exposures were made. Shortly afterwards, the Platypus was returned, unharmed, to its home stream.

Radiographs of a Platypus.—(*Copyright photo. by F. S. Fergus*)

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